

circumstance happen to destroy the *winter-egg*, there is always a subterranean provision of reproduction ready to replace the sexual generation which has not prospered.

Moreover, in the case before us, the winter-egg, that is to say the fecundated egg of the *Tetraneura*, besides being well sunk into the fissures of the bark, is further protected by the dried skin of the mother, for she does not expel it, but keeps it encysted within her, as do the Aphides of the galls of the *Lentiscus* observed by Prof. Derbès. Thus protected the egg braves the attacks of mites, Hemerobii, Thrips, and other small enemies.

In indicating the two species of grasses upon which I have found the subterranean forms of *Tetraneura*, I do not wish to imply that they do not attack others: on the contrary, I know very well that Passerini, for example, cites eleven species of grasses upon which he has found his *Pemphigus Boyeri*, which now becomes synonymous with *Tetraneura ulmi*; and as the latter is everywhere very common, it is very probable that in countries where maize or the dog's-tooth grass are wanting, it contrives to find other grasses to its taste. I believe this species is polyphagous.

But if it is polyphagous in its subterranean phase, it appears to be very faithful to the elm and even to *Ulmus campestris* in forming its gall. In fact I have, side by side with *Ulmus campestris*, two or three plants of *Ulmus effusa*, a tree very nearly allied to the former species, which the botanists can hardly distinguish except by the form of the flowers. Now at this present moment the elms have neither leaves nor flowers, and I put the same strip of paper upon *Ulmus effusa* as upon *Ulmus campestris*; nevertheless the insect makes no mistake, and I never find a *Tetraneura* upon the *Ulmus effusa*. On the other hand there is upon the latter tree a peculiar gall of a species of *Aphis* very nearly allied to *Tetraneura*, namely *Schizoneura compressa*, Koch. This arrives in numbers upon the species of elm that it prefers. I do not yet know whence it comes. Here, therefore, we have Aphides which, cleverer than the botanists, can recognize in the winter trees which the naturalist can only distinguish in summer by their flowers and fruits. Of course I make no attempt to explain such phenomena as these; I do not set up hypotheses, and confine myself to indicating exact facts, which I observe with the greatest possible attention. The problem of the biological evolution of the Aphides of the elm was enunciated more than a century ago; it is now solved.—*Comptes Rendus*, December 31, 1883, p. 1572.

#### *Note on two New California Spiders and their Nests.*

The Rev. Dr. McCook presented a small collection of spiders received from Mr. W. G. Wright, San Bernardino, Cal., mailed November 18. One of these came within a nest, and is a Saltigrado spider, probably an *Attus*. The nest is a rare one, and was so happily placed, by the builder, on a branch of sagebrush (*Ephedra antispyhilitica*) that it was preserved intact. It is the only one

which Mr. Wright had seen in site. Another nest, which he had no doubt was the same, he had observed torn from its place by some bird, as material for the construction of a bird's-nest.

Nests somewhat similar are habitually made by Pennsylvania Saltigrades upon or among leaves, which shrink up as they die and tear the spinning-work so as to destroy the specimen. The one exhibited was in perfect condition. It is the tent and egg-nest of the species which was alive within it, and the speaker thought to be new. It is a large example, five-eighths inch in body-length, stout, the legs of moderate thickness, the whole animal covered closely with greyish-white hairs, the skin beneath being black. Dr. McCook named the species, provisionally, *Attus opifea*, with a double reference to the discoverer (Mr. Wright) and the admirable housewright qualities of the araneid herself. The nest is externally an egg-shaped mass of white spinning-work, three inches long by two and one-half inches wide. The outer part consists of a mass of fine silken lines crossing in all directions and lashed to the twigs within which it is enclosed. This maze surrounds a sac or cell of thickly-woven sheeted silk, irregularly oval in shape, two inches long by one inch wide, and also attached to the surrounding twigs. At the bottom this cell or tent is pierced by a circular opening, which serves the spider as the door of her domicile. It is the habit of her genus to live and hibernate within such a silken nest. Against one side of the tent within is spun a lenticular cocoon (double convex) of thick white silk, within which the eggs were placed. The young spiders when received had escaped from the cocoon, and occupied the package-box. They are about one-eighth inch long, resembling the mother, but less heavily coated with grey.

This collection also contained three specimens (♀) of the genus *Pucetia*, as defined by Thorell\*. This genus belongs to the family Oxyopidæ of the Citigrade spiders, to which it is doubtless properly relegated in spite of certain analogies with the Attoidæ (Saltigrades) on the one hand, and the Philodrominæ (Laterigrades) on the other. Mr. Wright calls them "jumping spiders." Hentz, who describes several species of *Oxyopes*, says that *O. salticus* leaps with more force and vivacity than an *Attus*†. Of *O. viridans* he thinks it possible that the mother carries its young like *Lycosa*. This family of spiders is arboreal in habit, is found on plants, with their legs extended, thus disguising themselves after the manner known as "mimicry," and springing upon their prey. The cocoon is usually conical, surrounded with points, placed in a tent made between leaves drawn together and lashed, and is sometimes of a pale greenish colour. *O. viridans* will make a cocoon suspended in mid-air by threads attached to the external prominences, which she will watch constantly from a neighbouring site. Dr. McCook believed the species presented to be new; the body-length is fourteen millimetres; legs long, tapering, with many long spines. The body is yellow and pale yellow; the cephalothorax striped longitudinally with

\* See "On European Spiders," Nova Acta Reg. Soci. Sci. Upsalensis, 3rd ser. vol. vii. p. 196.

† 'Spiders of the United States,' p. 48.

bright red streaks; the abdomen marked above with red bell-shaped and angular patterns, and beneath with red streaks; the sternum red, the legs yellow with red rings at the joints. The species was named *Pucetia aurora*, because of the bright red streaks upon the yellow background, suggesting "the daughter of the dawn."

According to some field-notes forwarded by Mr. Wright since the above was in print, *Pucetia aurora* is rather abundant in a limited locality. The nests are uniformly upon bushes of *Eriogonum corymbosum*, and several specimens of them were sent. The nest is hung from three to four feet from the ground, and, being upon the topmost twigs, is easily seen from a distance. The cocoon is a straw-coloured sphere or ovoid, five-eighths of an inch in diameter. It is covered externally with various pointed rugosities, from which numerous lines extend to the adjoining foliage, and into the maze of right lines which extends below the corymb of the plant upon which all the specimens sent are attached. This reticularian snare doubtless serves as a temporary home for the young spiders. The cocoon has no suture, the spiderlings escaping by cutting the case, which is thick and closely woven. No floss padding was found inside of the case.

Upon approaching the nest, the mother is usually seen hovering over the young spiders, or guarding a new sack of eggs. She lays two and sometimes three broods on one twig. Sometimes the young ones will be still in the old nest, while the mother is guarding a new bundle of eggs immediately adjoining the old one. In no case were any young ones seen on the mother's back. The mother stays close by her nest. If the spiderlings be hatched, she will, perhaps, drop down a foot or so, if a first effort to capture her be not successful; but will not drop to the ground, unless forced to do so. If guarding her eggs, she must be forcibly separated from the cocoon. The young ones take alarm sooner than their mother; they drop down a few inches—or, at times, two feet—every one on its tiny thread, forming a pretty, swaying fringe. In a few moments, if all is still, they climb up again; but if frightened, will drop to the ground and run. The little ones in such case do not jump.

It is a further interesting fact in so-called "mimicry" that of several examples of *P. aurora* seen by Mr. Wright, one found on a green bush was in colour almost wholly green, with scarcely a trace of red; while two found on a hoary-white bush had simulated the white colour of their habitat. The specimens, as described above by Dr. McCook, approach in coloration the prevailing hue of the *Eriogonum* on which they were nested, and he was inclined to think that this is the normal colour of the adult, which is taken on as the animal matures; indeed, as the green and whitish specimens were not sent to him, he would be inclined to think (awaiting further evidence) that those colours may have been due to immature age. At least the tendency to such colours is strong in young spiders. However, the fact of mimicry is not improbable, as Dr. McCook had observed it in our native *Laterigrades*.

From the same gentleman and locality, Dr. McCook had received

a ♀ specimen of *Argiope fasciata*, which is thus located upon the Pacific coast, giving this beautiful and interesting spider a continental distribution.—*Proc. Acad. Nat. Sci. Philad.* 1883, Nov. 27, p. 276.

*On an Aerial Alga inhabiting the Bark of the Vine.*

By M. J. B. SCHNETZLER.

In the month of April of the present year (1883) there was observed upon numerous vines between Pully and Belmont (Canton de Vaud) a pulverulent matter of a brownish-red colour, which penetrated into the fissures of the periderm. This pulverulent matter is formed by an aerial alga, *Chroolepus umbrinum*, Ktz., or *Trentepohlia umbrina* (Kg.), Born., which is met with upon the bark of various trees, but has not hitherto been mentioned upon that of the vine. This alga contains a very refractive red oil, which diffuses a faint odour of violets; it does not appear to injure the vine, upon which occurs a complete cryptogamic vegetation formed by species of *Oscillaria*, *Nostoc*, and *Pleurococcus*, Confervæ, Mosses, and Lichens (*Physcia ciliaris*, *Pyrenula*, &c.). *Chroolepus umbrinum* is composed of small spherical cells of about 30  $\mu$ , forming small curved chains.

When the bark of the vine reddened by *Chroolepus umbrinum* is moistened with water, this same alga is seen very distinctly in the thallus of one of the lichens of the genus *Pyrenula*. It must be remarked, however, that the cells of the alga which occur in the thallus are smaller than those which exist in the air; they form in it very distinct little chains. We observe, moreover, all the transitions between the cells which exist out of the thallus and those which occur more or less deeply buried in it. Around the chaplets and free cells of the *Chroolepus* we sometimes find the filaments of the mycelium of a fungus, which surround them and bind them into small colonies.

The cells of *Chroolepus umbrinum*, which occur either in the free state or immersed in the thallus of *Pyrenula*, often present a green coloration. One can find all the transitions between entirely red cells and others partially or entirely green. This green coloration is met with especially when vine-bark reddened by the free *Chroolepus* is plunged into water. In this latter case we see issuing from some of these cells, which are still red, small ovoid bodies which swim briskly in the water (*zoogonidia* of Wille\*).

In a very interesting memoir by M. A. B. Frank † we find some observations precisely analogous to the preceding. It results from them, as we have likewise ascertained, that *Chroolepus umbrinum* may lead a completely free and independent existence, while the same alga occurs with smaller dimensions in the thallus of crustaceous lichens; but when, in consequence of the disaggregation of this thallus, the alga is set free, it multiplies and by degrees resumes its typical form and its normal dimensions.—*Bulletin de la Société Vaudoise des Sciences Naturelles*, sér. 2, vol. xix. no. 89, p. 53.

\* Just, Bot. Jahresber. 1878, p. 390.

† "Ueber die biologischen Verhältnisse des Thallus einiger Krustenflechten," in Just, Bot. Jahresber. 1876, p.70.